# CDC WONDER

## An informatics tool for public health practice

March 5, 2014

PHIN Partner Call


Division of Health Informatics and Surveillance

# Wide-ranging Online Data for Epidemiologic Research

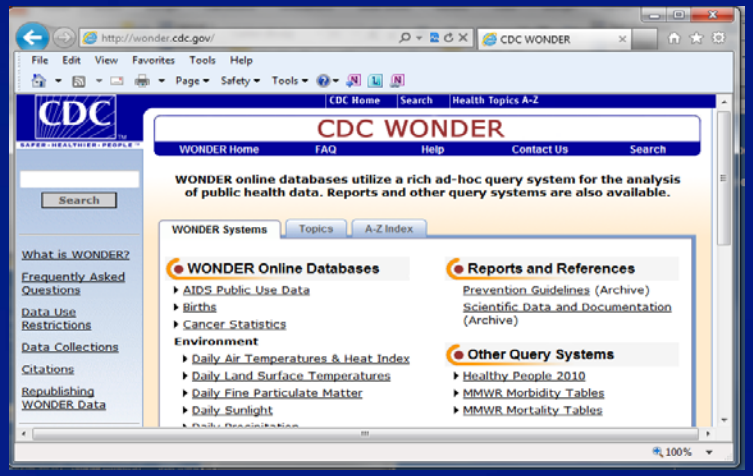
- ✓ Population health science research
- ✓ Evidence-based assessment
- ✓ Comparative analysis of summary statistics
- ✓ Visual maps & charts
- ✓ Large public health data collections
- ✓ Ad-hoc data queries

Click to access the CDC Wonder Web Site

# What is CDC WONDER?

CDC WONDER provides the following services:

- **Data Sharing  in 2013:**
  - Over 2.7  million custom statistical reports produced
  - Nearly 28 million visits  to the  public web site
  - Online access to nearly 300 gigabytes of data
- **Informatics services:**
  - Software
  - Web service API
  - Web hosting



# What data are available?

**Public WONDER online databases include:**

- **Vital statistics** since 1968, such as births and deaths, with additional focus on infant mortality, injury mortality and co-morbidity (in partnership with CDC/NCHS;
- **Cancer** diagnoses, incidence and mortality since 1999 (data from CDC/NCCDPHP, NIH/NCI);
- **Population estimates** since 1990 (from CDC/NCHS and the Census Bureau);
- **Communicable diseases** since 1984, such as HIV/AIDS cases, STD cases, TB cases (data from CDC/NCHHSTP);
- **Environmental exposures** since 1979 (data from NASA and NOAA); and
- **Vaccine safety reports** since 1990 (data from CDC/NCEZID and FDA).

WONDER online databases provide data query capabilities, statistical analysis, visualization and reporting for public health data collections.

# Who are our partners?

CDC programs partner with WONDER to provide external partners and the public with access to their data, in compliance with HHS and CDC data release policies. WONDER's partners include programs throughout CDC and other agencies.

- Participating CDC data providers include **NCHS, NCHHSTP, NCEZID, NCCDPHP** and **NCBDDD.**
- External data providers include **NASA, NOAA** and **FDA.**
- Data hosting partners include **CSELS, NCHS,** and **NCIRD.**
- CDC informatics partners include **ATSDR and ITSO.**

# About the informatics services:

- **Software:**
  - WONDER web application
    - Thin client, web browser and internet connection for user
    - Web server and SQL database for host
      - Java, XML, XSL and HTML on webserver,
      - SQL database engine
  - WONDER web service API
    - XML document exchange over HTTP

- **Web hosting:**
    - Data2010 (SAS)
    - NNDSS weekly provisional tables  (ASP and SQL)
    - 121 CMRS weekly death counts by city

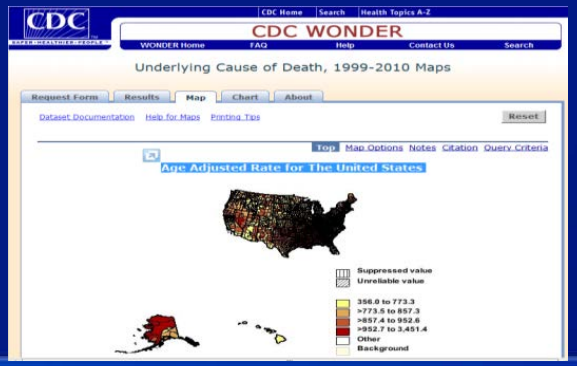
# What does WONDER do?

- WONDER users query record-level data and produce **ad-hoc summary statistics**, such as **frequency counts, rates, confidence intervals, standard errors**, and **percentages.**

- These results can be **exported** to human and machine-readable text files, or displayed in **tables, charts** or **maps.**

- The results include the **citation** and **context-sensitive caveat notes.**

- CDC WONDER imposes custom confidentiality constraints, that provides **data suppression when applicable** for the specific query results. Due to this suppression capability, WONDER can provide access to more detailed data than are available in static public-use data sets.



# Why WONDER?

CDC WONDER provides analytic data access and sharing. WONDER online databases are a standard tool that handles custom needs, so that researchers can run flexible queries. Advantages for data providers include:

- **Analytics:** Standard features to query data and get summary statistics; create tables, maps, charts and data exports; index data by any field (up to 5 cross-tabulations); limit data by any field; and create custom break points for categories.

- **Ease:** WONDER provides flexibility to researchers, reducing the burden for data providers to run custom queries in support of specific data requests. WONDER calculates statistics and imposes suppressions in real-time when queries are run, thus allowing more detail to be available in the data sets. Data providers share record-level data and rely on WONDER to apply suppression and calculate statistics.

- **Audience:** Recognized world-wide by the public health community, and widely used in public health curriculum.

# CDC WONDER's Architecture

Three tiers, model-view-controller (MVC) design.

1. User: "thin-client," just a web browser and internet connection needed.
2. Web server: the WONDER web application is built with Java (and XML, XSL and HTML) and runs under Tomcat. Internet connection needed, and an ODBC connection to the internal databases.
3. Database engine: SQL queries and protected tables.

Distributed, collaborative processing .

Open source tools and industry standards.

# Staffing :

- **What do we do?**
  - Load data – both routine updates and new data sets
    - Structured Query Language (SQL) programming for queries and statistical analysis
    - Database administration, create and design table schema
    - Data quality review and safeguards
  - Maintain and improve the WONDER web application
    - Java , XML, XSL, HTTP, CSS , JavaScript programming for new features
    - Platform configuration and upgrade support
  - Support stakeholders
    - Communicate with partners about data presentation requirements, restrictions and data quality issues
    - Respond to informatics partners and developers
    - Answer help-desk questions from end-users
- **How many?**
  - 3 full-time equivalent (FTE) federal employees

# A brief history of CDC WONDER:

- CDC WONDER began on the CDC mainframe in the late 1980's, under the guidance of Howard Ory, Andrew Friede and Jerry Sanders. The system provided menu-driven, immediate ad-hoc data analysis to CDC scientists.

- CDC WONDER/PC was issued in 1990 (official release in 1992) to EIS officers , state epidemiologists and other external partners. The system provided data analysis and communications with modem dial-up to a toll-free # or local area network connection. Secure email and bulletin boards were available, as well as surveillance data uploads. Design guidance was provided by Howard Ory, Andrew Friede and Joseph Reid.

- WONDER.CDC.GOV was launched on the web in 1995.

**Thank You.**

**Contact**

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**Click to access the CDC Wonder Web Site**

**For more information please contact Centers for Disease Control and Prevention**

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